

1 **III. AMENDMENTS TO THE CLAIMS**

2 1. (Original) A yaw, pitch and roll articulated assembly (1) for a multi-unit
3 vehicle comprised of:

4 a. a pitch assembly (100) with pitch means (130); said pitch assembly (100)
5 having pitch assembly interconnection means to a first vehicle unit (10); pitch means
6 (130) allowing a pitch relationship between the first vehicle unit (10) and a second
7 vehicle unit (20);

8 b. a yaw assembly (200) with yaw means; said yaw assembly (200) having pitch-
9 yaw assembly interconnection means of the pitch assembly (100) and the yaw assembly
10 (200); the yaw assembly (200) having yaw-roll assembly interconnection means; yaw
11 means allowing a yaw relationship between the first vehicle unit (10) and the second
12 vehicle unit (20);

13 c. a roll assembly (300) with roll means; said roll assembly (300) having yaw-roll
14 assembly interconnection means of the yaw assembly (200) and the roll assembly (300)
15 and having roll interconnection means to the second vehicle unit (20); roll means allowing
16 a roll relationship between the first vehicle unit (10) and the second vehicle unit (20).

17
18 2. (Original) A yaw, pitch and roll articulated assembly of claim 1 further comprising:

19 a. the pitch assembly interconnection means to a first vehicle unit (10) comprised
20 of a first pitch interconnection plate (110) affixed by interconnection affixing means to
21 the first vehicle unit (10);

22 b. the first pitch interconnection plate (110) is pitch rotatably affixed by pitch
23 interconnection affixing means (130) to a pitch assembly attachment plate (120);

24 c. the pitch assembly attachment plate (120) is immovably connected, by affixing
25 means, to at least one first yaw assembly plate (210);

26
27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030.

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552.

BEST AVAILABLE COPY

1 d. the pitch-yaw assembly interconnection means of the pitch assembly (100) and
2 the yaw assembly (200) rotatably interconnecting the pitch assembly (100) with the yaw
3 assembly (200);

4 e. the roll assembly (300) having a yaw-roll interface plate (310); the yaw-roll
5 interface plate (310) fixedly connected, by plate affixing means, to at least one second
6 yaw assembly plate (220); the yaw-roll assembly interconnection means yaw rotatably
7 interconnecting the yaw assembly (200) with the roll assembly (300); the yaw-roll
8 interface plate (310) interconnected by roll means with a second roll interconnection plate
9 (320); the second roll interconnection plate (320) affixed by plate affixing means to the
10 second vehicle unit (20).

11
12 3. (Original) A yaw, pitch and roll articulated assembly of claim 2 further comprising:

13 a. the pitch assembly attachment plate (120) having an assembly plate first side
14 (122), an assembly plate second side (123), an assembly plate top (126) and an assembly
15 plate bottom (127);

16 b. the first pitch interconnection plate (110) affixed by rotatable pitch
17 interconnection affixing means (130) to the pitch assembly attachment plate (120) at the
18 assembly plate front side (124) proximal the assembly plate bottom (127) or at the
19 assembly plate bottom (127);

20 c. the at least one first yaw assembly plate (210) having a first yaw assembly plate
21 edge (212), an extension edge (213), a first yaw assembly plate top (214) and a first yaw
22 assembly plate bottom (215); the at least one first yaw assembly plate edge (212)
23 immovably affixed by edge affixing means at the assembly plate second side (123); the
24 extension edge (213) distal from the first yaw assembly plate edge (212); the at least first
25 yaw assembly plate (210) extending from the assembly plate second side (123) outwardly
26

27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030.

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552,

1 from the assembly plate second side (123);

2 d. the at least one second yaw assembly plate (220) having a second yaw assembly
3 plate edge (222), a second extension edge (223), a second yaw assembly plate top (224)
4 and a second yaw assembly plate bottom (225); the at least one second yaw assembly
5 plate edge immovably affixed by edge affixing means at the yaw-roll interface plate (310)
6 at a yaw surface (314); the second extension edge (223) distal from the at least second
7 yaw assembly plate edge (222); the at least second yaw assembly plate (220) extending
8 from the yaw surface (314) outwardly from the yaw surface (314); the yaw-roll interface
9 plate (310) having a yaw-roll interface plate top (311) and a yaw-roll interface plate
10 bottom (312);

11 e. yaw interconnection means interconnecting the at least one first yaw assembly
12 plate (210) and the at least one second yaw assembly plate (220) proximal the respective
13 extension edge and second extension edge; yaw interconnection means receiving yaw
14 power means to urge the at least one first yaw assembly plate (210) to yaw rotate with
15 respect to the at least one second assembly plate (220).

16
17 4. (Original) A yaw, pitch and roll articulated assembly of claim 3 further comprising:

18 a. the first yaw assembly plate edge (212) immovably affixed by edge affixing
19 means at the assembly plate second side (123) intermediate the assembly plate top (126)
20 and the assembly plate bottom (127) or proximal the assembly plate bottom (127); yaw
21 interconnection means interconnecting the at least one first yaw assembly plate (210) and
22 the at least one second yaw assembly plate (220) proximal the respective extension edge
23 (213) and second extension edge (223) comprised of at least one first aperture (217), from
24 the first yaw assembly plate top (214) to the first yaw assembly plate bottom (215),
25 proximal the at least one first yaw assembly plate extension edge (213), and at least one
26

27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030

Floyd E. Ivey, USPTO 35552,

Application No. 10/647,030

1 second aperture (227) from the second yaw assembly plate top (224) to the second yaw
2 assembly plate bottom (225), proximal the second extension edge (223) wherein said at
3 least one first aperture (217) and said at least one second aperture (227) are aligned to
4 receive rotatable shaft or shaft interrelated with gear interconnecting means; said shaft or
5 shaft interrelated with gear interconnecting means receiving yaw power means to urge the
6 rotation of the at least one first yaw assembly plate (210) relative to the at least one
7 second yaw assembly plate (220);

8 b. the first pitch interconnection plate (110) affixed by rotatable pitch
9 interconnection affixing means (130) to the assembly plate first side (122) intermediate
10 the assembly plate top (126) and the assembly plate bottom (127) or proximal the
11 assembly plate bottom (127);

12 c. the first pitch interconnection plate (110), the pitch assembly attachment plate
13 (120), the at least one first yaw assembly plate (210), the at least one second yaw assembly
14 plate (220), the yaw-roll interface plate (310), and the second roll interconnection plate
15 (320) are substantially planar;

16 d. rotatable pitch interconnection affixing means (130) comprised of hinge means
17 (130); roll means comprised of first roll interconnecting means (330) received by second
18 roll interconnecting means (340).

19
20 5. (Original) A yaw, pitch and roll articulated assembly of claim 4 further comprising:

21 a. rotatable yaw power means comprised of a motor means (400) driving a motor
22 shaft (410); the motor means (400) stationarily fixed by stationary fixing means at either
23 the first yaw assembly plate top (214), the first yaw assembly plate bottom (215), the
24 second yaw assembly plate top (224) or the second yaw assembly plate bottom (225);
25 where the motor means (400) is affixed to the at least one first yaw assembly plate (210)
26

27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552,

1 the motor shaft (410), either directly or by gear means torque connected to the shaft or
2 shaft interrelated with gear interconnection means, key notch or gear interconnected to the
3 at least one second yaw assembly plate (220); where the motor means (400) is affixed to
4 the at least one second yaw assembly plate (220) the motor shaft (410), either directly or
5 by gear means torque connected to the shaft or shaft interrelated with gear interconnection
6 means, key notch means or gear means interconnected to the at least one first yaw
7 assembly plate (210);

8 b. first roll interconnecting means (330) comprised of threaded means received by
9 second roll interconnecting means (340) comprised of complementary receiving threaded
10 means.

11
12 6. (Original) A yaw, pitch and roll articulated assembly of claim 5 further comprising:

13 a. motor means (400) yaw power to the shaft (410), key (420) and notch (425) or
14 to shaft (410) interrelated with gear means (430) interconnection at the at least one first
15 aperture (217) or at the at least one second aperture (227) urges the respective at least one
16 first yaw assembly plate (210) to yaw rotate relative to the at least one second yaw
17 assembly plate (220) responsive to power means signals received by the motor means
18 (400) at signal input means ((440); motor means comprised of electric, pneumatic or
19 hydraulic power transmitted by steering means;

20 b. first roll interconnecting means (330) comprised of threaded means received by
21 second roll interconnecting means (340) comprised of complementary receiving threaded
22 means; first roll interconnecting means (330) immovably affixed to second roll
23 interconnection plate (320) at a roll side (321); the second roll interconnection plate (320)
24 affixed by means to the second vehicle (20) at a roll-vehicle side (322)

25
26
27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030.

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552,

- 1 7. (Original) A yaw, pitch and roll articulated assembly of claim 3 further comprising:
2 a. the at least one first yaw assembly plate (210) comprised of at least at least one
3 first yaw assembly plate(210) and at least one first top assembly plate (211);
4 b. the at least one first yaw assembly plate (210) having a first yaw assembly plate
5 edge (212), an extension edge (213), a first yaw assembly plate top (214) and a first yaw
6 assembly plate bottom (215); the at least one first yaw assembly plate edge (212)
7 immovably affixed by edge affixing means at the assembly plate second side (123); the
8 extension edge (213) distal from the first yaw assembly plate edge (212); the at least first
9 yaw assembly plate (210) extending from the assembly plate second side (123) outwardly
10 from the assembly plate second side (123);
11 c. the at least one top yaw assembly plate (211) having a first yaw assembly plate
12 edge (232), an extension edge (233), a top yaw assembly plate top (234) and a top yaw
13 assembly plate bottom (235); the at least one top yaw assembly plate edge (232)
14 immovably affixed by edge affixing means at the assembly plate second side (123); the
15 extension edge (233) distal from the top yaw assembly plate edge (232); the at least one
16 top yaw assembly plate (211) extending from the assembly plate second side (123)
17 outwardly from the assembly plate second side (123);
18 d. the pitch assembly attachment plate (120) is immovably connected, by
19 immovable affixing means, to the at least one first yaw assembly plate (210) proximal the
20 assembly plate bottom (127) and the at least one first top assembly plate (211) proximal
21 the assembly plate top (126);
22 e. the at least one second yaw assembly plate (220) comprised of at least at least
23 one second yaw assembly plate(220) and at least one second top assembly plate (221);
24 f. the at least one second yaw assembly plate (220) having a second yaw assembly
25 plate edge (222), an extension edge (223), a second yaw assembly plate top (224) and a
26

27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552,

1 second yaw assembly plate bottom (225); the at least one second yaw assembly plate
2 edge (222) immovably affixed by edge affixing means at the yaw-roll interface plate
3 (310) at the yaw surface (314); the extension edge (223) distal from the second yaw
4 assembly plate edge (222); the at least second yaw assembly plate (211) extending from
5 the yaw-roll interface plate (310) outwardly from the yaw-roll interface plate (310);

6 g. the at least one second top assembly plate (221) having a second top yaw
7 assembly plate edge (242), an extension edge (243), a second yaw top assembly plate top
8 (244) and a second yaw top assembly plate bottom (245); the at least one second yaw top
9 assembly plate edge (242) immovably affixed by edge affixing means at the yaw-roll
10 interface plate (310) at the yaw surface (314); the extension edge (243) distal from the
11 second top assembly plate edge (242); the at least second top yaw assembly plate (221)
12 extending from the yaw-roll interface plate (310) outwardly from the yaw-roll interface
13 plate (310);

14 h. the at least one second yaw assembly plate (220) is immovably affixed by
15 immovable affixing means, at the yaw-roll interface plate (310) at the yaw surface (314)
16 proximal the yaw-roll interface plate bottom (312) and the at least one second top
17 assembly plate (221) is immovably affixed by immovable affixing means at the yaw-roll
18 interface plate (310) at the yaw surface (314) proximal the yaw-roll interface plate top
19 (311);

20 i. yaw interconnection means interconnecting the at least one first yaw assembly
21 plate (210) and the at least one second yaw assembly plate (220) by aligned apertures,
22 proximal the extension edges (213) and (233), receiving shaft interconnection means
23 (500) or yaw power by motor means (400) and motor shaft means (410) or motor
24 shaft means (410) with gear means (430);

25 j. yaw interconnection means interconnecting the at least one top yaw assembly
26

27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030.

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552,

1 plate (211) and the at least one second top yaw assembly plate (221) by aligned apertures,
2 proximal the extension edges (233) and (243), receiving shaft interconnection means
3 (500) or yaw power by motor means (400) and motor shaft means (410) or motor shaft
4 means (410) with gear means (430).

5
6 8. (Currently Amended) A yaw, pitch and roll articulated assembly of claim 7 further
7 comprising:

8 a. shaft interconnection means (500) comprised of nut and bolt (500) connection
9 means; yaw power by motor means (400) comprised of electric, pneumatic or hydraulic
10 motor means with shaft (410), key (420) and notch (425) or shaft (410) and gear (430)
11 drive means;

12 b. the first pitch interconnection plate (110), the pitch assembly attachment plate
13 (120), the at least one first yaw assembly plate (210), the at least one top yaw assembly
14 plate (211), the at least one second yaw assembly plate (220), the at least one top second
15 yaw assembly plate (221) the yaw-roll interface plate (310), and the second roll
16 interconnection plate (320) are substantially planar;

17 c. rotatable pitch interconnection affixing means (130) comprised of hinge means
18 (130); roll means comprised of first roll interconnecting means (330) received by second
19 roll interconnecting means (340).

20
21 9. (Currently Amended) A yaw, pitch and roll articulated assembly of claim 8 further
22 comprising:

23 a. rotatable yaw power means comprised of a motor driving a motor shaft; the
24 motor stationarily fixed by stationary fixing means at either the first yaw assembly plate
25 top, the first yaw assembly plate bottom, the second yaw assembly plate top or the second
26

27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030.

Floyd E. Ivey, USPTO 35552,

Application No. 10/647,030

1 yaw assembly plate bottom; drive means comprised of shaft (410), key (420) and notch
2 (425) or shaft (410) and gear (430) drive means; the motor shaft either directly or by gear
3 means torque connected to the shaft or shaft interrelated with gear interconnection;
4 b. first roll interconnecting means (330) comprised of threaded means received by
5 second roll interconnecting means (340) comprised of complementary receiving threaded
6 means; first roll interconnecting means (330) immovably affixed to second roll
7 interconnection plate (320) at a roll side (321); the second roll interconnection plate (320)
8 affixed by means to the second vehicle (20) at a roll-vehicle side (322) .
9

10 10. (Original) A yaw, pitch and roll articulated assembly of claim 9 further comprising:
11 a. shaft or shaft interrelated with gear interconnection is key means interrelated at
12 the at least one first aperture or at the at least one second aperture by shaft or aperture key
13 received by shaft or aperture notch; means of transmitting yaw power to the motor.
14
15
16
17
18
19
20
21
22
23
24
25
26

27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552,

12

Z:\Client\Clark.Bruce\Patent\Responses\Response.112.102.103.041004DRAFT.wpd

IV. ELECTION: THE DISTINCT SPECIES OF THE YAW ASSEMBLY.

The Examiner has asserted that patentably distinct species of the yaw assembly of the claimed invention are demonstrated in Fig. 5 and in Fig. 6. Your applicant elects the species identified by the Examiner as I and as shown in Fig. 5.

Your applicant respectfully elects with traverse. The Examiner's attention is respectfully drawn to Fig 5 and Fig. 6. The sole distinction between the Yaw assembly of Fig 5 and that of Fig. 6 is the fact that Fig. 5 provides a single interrelated set of outwardly projecting first yaw and second yaw assembly plates which bear on each other; one plate receives the motor means and the other plate provides the "key" to allow a torque between the first yaw and the second yaw assembly plate thereby causing the one to rotate relative to the other. The motor shaft means (410) being received by the respective apertures in the first yaw and the second yaw assembly plate is illustrated by a dashed line

In the embodiment of Fig. 6, two sets of plates are demonstrated. The top yaw assembly plates are interconnected by a Nut and Bolt means (500) as indicated by the dashed line extending through the apertures of the upper yaw assembly plates. The dashed line is seen to jog to the right and is illustrated to then be received by the second aperture. The illustration, in Fig. 6, of the motor is not as clear as it would be with a final formal drawing. The Examiner's attention is drawn to the dashed line extending from the motor shaft means (410) which jogs to the right indicating that it is not extending through or affixed to the aperture in the top plate but rather that it is interrelated to the aperture in the bottom plate. It is recognized that the dashed line did not illustrate the jog so that the same configuration is realized between the motor means (400) and the bottom yaw assembly plates. Hence a revised Fig. 6 is provided and the Examiner is respectfully requested to see the illustration to show the same motor means (400) location as is

Certificate of facsimile filing
on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552,

13

\\NPClient\Clnk\Bruce\Patent\Response\Response.112.102.103.041004DRAFT.wpd

illustrated in both Fig. 4 and Fig. 5. The motor shaft means (410) is received by one bottom plate and is key interrelated to the second bottom yaw assembly plate thereby allowing for a torque rotation of the first set relative to the second set.

Your applicant asserts that claims 1 and 2 are generic. Your applicant respectfully asserts that claims 1 through 4 read on the apparatus of Fig. 5 and that the dependent claims therefrom are pertinent to the apparatus of Fig. 5. The Examiner is respectfully requested to withdraw this requirement for Election.

V. ELECTION: THE DISTINCT SPECIES OF THE YAW INTERCONNECTION MEANS.

The Examiner asserts at page 3 paragraph 3 that if Species II, shown in Fig. 6, is elected that the application contains claims directed to patentably distinct species of "the yaw interconnection means" of "A. Nut and bolt (500)" and "B. Motor Means (400)". Your applicant has elected Species I re: Fig. 5.

However, your applicant draws the Examiner's attention to the above comments relative to the illustration of Fig 6 showing the Nut and Bolt (500) to interconnect the upper yaw assembly plates and the motor means (400) to interconnect, rotatably and to provide torque, the bottom yaw assembly plates.

VI. ELECTION: THE DISTINCT SPECIES OF THE MOTOR MEANS.

The Examiner states at page 4, paragraph 4 that if applicant elects species I or B that further election is required. Your applicant elected Species I. Hence, the examiner states that patentably distinct species of Motor Means exist in "i. electric", "ii. pneumatic" and "iii. hydraulic".

Your applicant elects "iii. hydraulic" with traverse. Your applicant respectfully

Certificate of facsimile filing
on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030.

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552,

1 observes that Claim 5 claims "motor means" generically and that Claim 6 claims motor
2 means to be electric, pneumatic or hydraulic. Your applicant believes that claims 5
3 through 10 read on this election. Your applicant respectfully notes that the selection of
4 the motor means, whether electric, pneumatic or hydraulic, will be a design choice and
5 will be viewed by those of ordinary skills in the motor arts to be an obvious design
6 consideration. Your applicant respectfully requests the Examiner to withdraw this
7 requirement of election.

8
9 **VII. ELECTION: THE DISTINCT SPECIES OF THE DRIVE MEANS.**

10 At page 5 paragraph 5 the Examiner states that if applicant elects species I or B
11 that further election is required and that the application contains claims directed to
12 patentably distinct species of the drive means of "a. shaft (410), key (420) and notch
13 (425)" and "b. shaft (410) and gear (430)".

14 Your applicant elects "a. shaft (410), key (420) and notch (425). Your applicant
15 has amended Claim 8 to claim "drive means". Claim 9 has been currently amended to
16 state that "drive means comprised of shaft (410), key (420) and notch (425) or shaft (410)
17 and gear (430) drive means." Your applicant asserts that claim 8 is generic and that
18 claims 8 and 9 read on this election. Your applicant respectfully asserts that shafts, keys,
19 notches or shafts and gears are design considerations. Your applicant respectfully
20 requests the Examiner to withdraw this required election.

21
22
23
24
25
26
27 Certificate of facsimile filing
28 on October 4, 2004 by Floyd E. Ivey,
Serial No. 10/647,030.

Application No. 10/647,030

Floyd E. Ivey, USPTO 35552,

15

Z:\IP\client\Clark, Bruce\Patent\Responses\Response.112.102.103.041004DRAFT.wpd

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.